Complete Summary

GUIDELINE TITLE

Update of newborn screening and therapy for congenital hypothyroidism.

BIBLIOGRAPHIC SOURCE(S)

American Academy of Pediatrics, Rose SR, Section on Endocrinology and Committee on Genetics, American Thyroid Association, Brown RS, Public Health Committee, Lawson Wilkins Pediatric Endocrine Society, Foley T, Kaplowitz PB, Kaye CI, Sundararajan S, Varma SK. Update of newborn screening and therapy for congenital hypothyroidism. Pediatrics 2006 Jun;117(6):2290-303. [87 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

All clinical reports and policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Congenital hypothyroidism

GUIDELINE CATEGORY

Diagnosis
Evaluation

Management
Prevention
Screening
Treatment

CLINICAL SPECIALTY

Endocrinology
Family Practice
Pediatrics
Preventive Medicine

INTENDED USERS

Clinical Laboratory Personnel
Physicians

GUIDELINE OBJECTIVE(S)

To provide updated recommendations for screening and therapy for congenital hypothyroidism

TARGET POPULATION

- All newborns in the United States
- Infants and children with suspected or confirmed congenital hypothyroidism

INTERVENTIONS AND PRACTICES CONSIDERED

Screening/Prevention

1. Newborn screening for congenital hypothyroidism (CH) using:
    - A primary thyroid-stimulating hormone (TSH)/backup thyroxine (T_4) method
    - A primary T_4/backup TSH method
    - A combined TSH plus T_4 measurements

Evaluation/Management/Treatment

1. Detailed history and physical examination
2. Referral to pediatric endocrinologist
3. Rechecking serum TSH and free thyroxine (FT_4)
4. Parental education, including the importance of adherence to the treatment plan
5. Thyroid ultrasonography and/or thyroid scan including iodine 123 (^{123}I) or sodium technetium 99m pertechnetate (^{99m}Tc) thyroid uptake and/or scan
6. Oral levothyroxine administration
7. Rechecking T_4 and TSH at specific intervals
8. Assessing permanence of CH

MAJOR OUTCOMES CONSIDERED

Sensitivity and accuracy of screening tests

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

Published cost analyses were reviewed.

It has been estimated that the cost of screening for congenital hypothyroidism (CH) is much lower than the cost of diagnosing CH at an older age. This estimate does not include the loss of tax income resulting from impaired intellectual capacity in the untreated but noninstitutionalized person.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Screening Method

Two screening strategies for the detection of congenital hypothyroidism (CH) have evolved: a primary thyroid-stimulating hormone (TSH)/backup thyroxine (T_4) method and a primary T_4/backup TSH method. In addition, an increasing number of programs use a combined primary TSH plus T_4 approach.

Primary TSH With Backup T_4 Measurements

Most programs in Europe, Japan, Canada, Mexico, and the United States screen by using primary TSH measurements, supplemented by T_4 determinations for infants with elevated TSH values. With this approach, delayed TSH elevation in infants with thyroid-binding globulin (TBG) deficiency, central hypothyroidism, and hypothyroxinemia will be missed. Delayed TSH elevation is particularly common in infants with low birth weight (LBW [<2500g]) and very low birth weight (VLBW [<1500g]).

Current TSH assay techniques (enzyme-linked immunoassays, chemiluminescent assays, and fluoroimmunoassays) use nonradioactive labels and have improved sensitivity with the potential for better separation between normal and abnormal TSH concentrations. Thus, many screening programs are considering switching to a primary TSH approach. However, the trend toward early discharge of mothers and infants (before 48 hours of age) presents a problem with the switch to a primary TSH approach because of the normal increase in TSH postnatally. With early hospital discharge, the first screening specimen commonly is obtained before 48 hours of age. Recent data using a sensitive and specific immunofluorometric assay indicate that normal TSH values before 24 hours of age are not as high as those using previous assays and usually less than the cutoff value of 20 to 25 mU/L. A 50% reduction in abnormal values occurred when age-adjusted TSH cutoffs were used. Thus, the current experience using newer assays in a primary TSH screening approach in a population of infants discharged after 24 hours of age shows lower patient recall rates with negligible false-negative test results.

Primary T_4 With Backup TSH Measurements

An initial filter-paper blood-spot T_4 measurement is followed by a measurement of TSH for filter-paper specimens with low T_4 values. The primary T_4 approach will detect primary hypothyroidism in infants with low or low-normal T_4 with elevated

TSH concentrations (prevalence ranging from 1 in 3,000 to 1 in 4,000 newborn infants). In addition to detecting primary hypothyroidism, the primary T_4/backup TSH approach can also identify infants with TBG deficiency (prevalence ranging from 1 in 5,000 to 10,000 newborn infants) and central hypothyroidism (low or low-normal T_4 with normal TSH concentration; prevalence: 1 in 50,000 newborn infants). Programs that quantify high T_4 values also have the potential to identify infants with hyperthyroxinemia (1 in 20,000 to 1 in 40,000 newborn infants). This approach, however, will miss the condition in an infant with an initially normal T_4 concentration and delayed increase in TSH. To ensure identification of infants with CH who have low-normal T_4 values, most screening programs use a T_4 concentration cutoff of <10th percentile for the days' assay.

Programs using a primary T_4 with secondary TSH approach will follow-up on infants with a low T_4 and elevated TSH screening result. The recall rate for primary hypothyroidism in these screening programs is approximately 0.05%, similar to that in primary TSH screening programs. However, some primary T_4 screening programs also report low T_4 results below an absolute cutoff (e.g., 3.0 micrograms/dL [39 nmol/L]) in infants even if the TSH was normal. The recall rate (and therefore the false-positive rate) will be higher (approaching 0.30%) with this practice.

Combined Primary TSH Plus T_4 Measurements

Methods for the simultaneous measurement of T_4 and TSH are available (DELFIA data). This represents the ideal screening approach, especially once it is possible for free thyroxine (FT_4) to be measured accurately and cost-effectively in the eluates from filter-paper blood spots. Until T_4 and TSH determinations can be performed practically for all infants, physicians should be aware of the potential limitations of each method of screening for CH.

The Specimen

Every infant should be tested before discharge from the nursery, optimally by 48 hours to 4 days of age. As noted above, specimens collected in the first 24 to 48 hours of life may lead to false-positive TSH elevations when using any screening test approach. However, screening before hospital discharge or before transfusion is preferable to missing the diagnosis of hypothyroidism. False-negative results may occur by screening a very sick newborn or after transfusion. Because newborn blood specimens are used for a variety of screening tests and shared among different laboratories, every effort should be made to collect adequate and sufficient blood in the recommended manner.

It is highly desirable that the blood be collected when the infant is between 2 and 4 days of age, but there are situations in which this is virtually impossible. In infants discharged from the nursery before 48 hours of age, blood should be obtained before discharge. In instances such as home births or in the case of a critically ill or preterm neonate, blood should be obtained by 7 days of age, recognizing that samples obtained after 4 days of age are late for screening of congenital adrenal hyperplasia or metabolic disease. Particular care must be taken with infants in neonatal intensive care units (NICUs). In such cases, more urgent medical problems may result in missed newborn screening. When an infant is transferred to another hospital, the first hospital must indicate whether the

specimen has been collected. The second hospital should obtain a specimen if there is no proof that blood was collected before the transfer.

Some state screening programs, testing 10% of newborns in the United States, perform newborn screening on specimens routinely collected at 2 time periods. These programs report that CH is detected in approximately 10% of the affected infants only as a result of collection of a second specimen. The additional incidence of CH based on a second screening at 2 weeks of age is approximately 1 in 30,000.

Accurate screening results depend on good-quality blood spots. The filter paper designed for newborn screening bears printed circles. Capillary blood samples are placed in these circular areas to fill and saturate them. Spotting blood over a previous blood spot, or double spotting, causes invalid results, and these blood spots should not be used. The recall of an infant for testing because of an unsatisfactory filter-paper specimen causes needless delay in diagnosis and treatment of a newborn with CH. Specimens that are technically unsatisfactory or contain insufficient amounts of blood should not be assayed. Blood samples should be collected on approved filter-paper forms, dried at room temperature, and not subjected to excessive heat. The blood should completely saturate the filter paper and be applied to 1 side only. Filter-paper spots should not be handled, placed on wet surfaces, or contaminated by coffee, milk, or other substances. Any of these have the potential to invalidate the results regardless of the method used. Testing of an unsatisfactory specimen (because of insufficient blood) can result in a false-negative TSH value. False-negative values can also result from human error in the processing of satisfactory specimens or in erroneous reporting of the results.

Test Results

Transmission of Results and Follow-up Testing

Newborn screening test results must be communicated rapidly back to the physician or hospital identified on the screening filter-paper card. The responsibility for transmission of these results rests with the authority or agency that performed the test. In general, when an abnormal screening result is found, the responsible physician is notified immediately so that he or she can arrange for follow-up testing. Screening test results should be entered into the patient's record. If the informed physician is no longer caring for or cannot locate the infant, he or she should notify the newborn screening laboratory immediately. In such situations, the local health department is often helpful in locating these infants to ensure that they are not lost to follow-up.

Low T_4 and Elevated TSH Values

Any infant with a low T_4 concentration and TSH concentration greater than 40 mU/L* is considered to have primary hypothyroidism. Such infants should be examined immediately and have confirmatory serum testing performed to verify the diagnosis. Treatment with replacement levothyroxine (L-T_4) should be initiated as soon as confirmatory tests have been drawn and before the results of the confirmatory tests are available. For cases in which the screening TSH concentration is only slightly elevated but less than 40 mU/L, another filter-paper

specimen should be obtained for a second newborn screening. Ten percent of infants with confirmed CH have TSH values between 20 and 40 mU/L. It is important that age-appropriate normative values be used. The reference range for TSH for the most common time of TSH reevaluation (between 2 and 6 weeks of age) is 1.7 to 9.1 mU/L.

* All filter-paper TSH [and T_4] levels here are reported as serum equivalents. Some laboratories report screening results per unit of blood, a value that is approximately half the concentration in serum. The guideline developers recommend that all laboratories report results per unit of serum, because TSH and T_4 are preferentially distributed into the serum.

See the original guideline document for a discussion of normal T_4 and elevated TSH values, low T_4 and normal TSH values, low T_4 and delayed TSH increase, and transient TSH elevation.

Clinical Management of Newborn Infants with Low T_4 and Elevated TSH Values

Infants with low T_4 and elevated TSH concentrations have CH until proven otherwise. Management should include the following (see Table 1 below):

1. The infant should be seen by his or her physician without delay. Consultation with a pediatric endocrinologist is recommended to facilitate diagnostic evaluation and optimal management.
2. A complete history, including prenatal thyroid status (maternal drugs and medications) and family history should be obtained, and physical examination should be performed.
3. Serum should be obtained for confirmatory measurements of TSH and FT_4. An elevated thyroglobulin concentration may suggest dyshormonogenesis. Care must be taken to compare the serum results to normal thyroid hormone (TH) concentration for age. When there is history of a maternal autoimmune thyroid disorder or a previously affected infant, measurement of thyrotropin receptor (TSH-R)-blocking antibodies (TRBAbs) in the infant and/or mother may identify a transient form of neonatal hypothyroidism.
4. Education of parents by trained personnel using booklets or visual aids is highly desirable. Education should focus on (a) the etiology of CH, (b) the lack of correlation of parental lifestyle during pregnancy with causes of the disease, (c) the benefit of early diagnosis in preventing mental retardation, (d) the appropriate manner in which TH is administered and the substances (e.g., soy, iron, calcium, and fiber) that can interfere with TH absorption, (e) the importance of adherence to the treatment plan, and (f) the importance of periodic follow-up care.
5. Optional diagnostic studies include thyroid ultrasonography or iodine 123 (^{123}I) or sodium technetium 99m pertechnetate (^{99m}Tc) thyroid uptake and/or scan to identify functional thyroid tissue. Although ^{123}I tends to give a more accurate uptake and scan picture, it may not be readily available in all hospitals. ^{99m}Tc is generally more readily available and a much less expensive radioisotope. The half-life of ^{123}I is 13.3 hours, compared with 8 days for iodine 131 (^{131}I). ^{123}I exposes the infant to much lower doses of ionizing radiation compared with ^{131}I (probably one 100th of the ^{131}I dose).

Table 1. Management of CH

Initial workup

- Detailed history and physical examination
- Referral to pediatric endocrinologist
- Recheck serum TSH and FT_4
- Thyroid ultrasonography and/or thyroid scan

Medications

- L-T_4: 10–15 micrograms/kg by mouth once daily

Monitoring

- Recheck T_4, TSH
- 2 to 4 weeks after initial treatment is begun
- Every 1 to 2 months in the first 6 months
- Every 3 to 4 months between 6 months and 3 years of age
- Every 6 to 12 months from 3 years of age to end of growth

Goal of therapy

- Normalize TSH and maintain T_4 and FT_4 in upper half of reference range.

Assess permanence of CH

- If initial thyroid scan shows ectopic/absent gland, CH is permanent.
- If initial TSH is <50mU/L and there is no increase in TSH after newborn period, then trial off therapy at 3 years of age.
- If TSH increases off therapy, consider permanent CH.

Abbreviations
TSH, thyroid-stimulating hormone; T_4, thyroxine; FT4, free thyroxine; L-T4, levothyroxine; CH, congenital hypothyroidism

There remains some controversy regarding the risk-benefit ratio of early thyroid scanning of infants with suspected hypothyroidism. For physicians who opt for imaging, the benefits can be summarized as follows:

1. If an ectopic gland is demonstrated, a permanent form of thyroid disease and CH has been established.
2. The absence of thyroid gland uptake is most often associated with thyroid aplasia or hypoplasia. When radioiodine uptake is absent but ultrasonographic examination reveals a normal gland, a TSH-R defect, iodine-transport defect, or maternal transfer of TRBAbs may be present.
3. Normal scan findings (or a goiter) indicate a functioning thyroid gland with regard to iodine uptake and alert the physician to a probable hereditary defect in T_4 synthesis. Measurement of serum thyroglobulin will help to separate thyroglobulin synthetic defects from other causes of hypothyroidism. Exposure to an exogenous goitrogen other than iodine, such as antithyroid drugs, will produce a similar picture. Finally, some infants exposed to maternal TRBAbs may have a normal scan if their hypothyroidism is partially

compensated. The identification of a genetically mediated thyroid synthetic enzyme defect is especially important for families planning on having additional children. In such cases, the scan enables the physician to arrange for genetic counseling.

4. Some infants with normal scan findings at birth who do not fall into one of the above categories may have a transient form of hypothyroidism. These infants should undergo a careful follow-up evaluation after 3 years of age, when it is safe to discontinue treatment temporarily under the conditions described in "Assessment of Permanence of Hypothyroidism" in the original guideline document.

Treatment need not be delayed to perform the scan. A thyroid scan can be performed within the first few days of treatment, because the elevated TSH found in patients with permanent CH rarely normalizes within this time period. A serum TSH measurement should be obtained at the time of the scan. If L-T_4 therapy has caused the TSH concentration to be <30 mU/L, ultrasonography can still be performed. A scan can be performed after the child is 3 years of age, when TH treatment can be interrupted without danger to the developing central nervous system.

The usual dose of ^{123}I, the preferred isotope, is 0.925 MBq (25 microCi). This represents a small amount of radiation exposure, equivalent to the amount of exposure with 2 to 3 chest radiographs. However, the radiation exposure is potentially 100 times greater if ^{131}I or large doses of isotope are administered. For this reason, the procedure should be performed by experienced personnel with optimal equipment, using the minimally recommended tracer dose.

To avoid unnecessary radiation, some investigators prefer ultrasonography as the initial imaging procedure to identify the presence and location of thyroid tissue. However, gray-scale ultrasonography is much less sensitive than scintigraphy in detecting the presence of ectopic thyroid tissue, the most common cause of CH.

Treatment

All infants with hypothyroidism, with or without goiter, should be rendered euthyroid as promptly as possible by replacement therapy with TH. An optimal cognitive outcome depends on both the adequacy and timing of postnatal therapy, particularly in severe cases of CH (T_4 <5 micrograms/dL). However, what constitutes optimal TH therapy is not yet certain. The goal of therapy is to normalize T_4 within 2 weeks and TSH within 1 month. An initial dosage of 10 to 15 micrograms/kg of L-T_4 (depending on the severity of the initial hypothyroidism) has been recommended. When a higher initial dose of L-T_4 (50 micrograms [i.e., 12–17 micrograms/kg]) is used, the serum T_4 normalizes in 3 days and the TSH returns to the target range by 2 weeks of therapy. In the long run, evaluation of cognitive outcome is important after use of this increased dose. Currently the evidence base does not indicate cognitive benefit from thyroid therapy of hypothyroxinemia of prematurity in the absence of TSH elevation.

Administration of L-T_4 is the treatment of choice. Although triiodothyronine (T_3) is the more biologically active TH, most brain T_3 is derived from local monodeiodination of T_4, so T_3 should not be used. The pill should be crushed and suspended in a few milliliters of formula, breast milk, or water. Care should be

taken to avoid concomitant administration of soy, fiber, or iron. Breastfeeding can continue. Only T_4 tablets should be used; currently there are no liquid formulations licensed by the US Food and Drug Administration. T_4 suspensions that may be prepared by individual pharmacists may lead to unreliable dosage. T_4 is expected to increase to more than 10 micrograms/dL, FT_4 is expected to increase to more than 2 ng/dL by 2 weeks after initiating therapy, and TSH should normalize by 1 month. FT_4 measurement at 1 week of therapy can confirm whether the serum concentration is increasing appropriately. The L-T_4 dose should be adjusted according to the infant's clinical response and serum FT_4 and TSH concentrations.

During therapy, the serum total T_4 or FT_4 should and might be in the upper half of the reference range (target values depend on the assay method used [T_4: 10–16 micrograms/dL (130–206 nmol/L); FT_4: 1.4–2.3 ng/dL (18–30 pmol/L)]) during the first 3 years of life with a low-normal serum TSH. The latter may sometimes be delayed because of relative pituitary resistance. In such cases, characterized by a normal or increased serum T_4 and an inappropriately high TSH concentration, the T_4 value is used to titrate the dose. Nonadherence to the treatment is the most common cause of persistent TSH elevation and should be excluded. Those infants with low serum T_4 concentrations (below 10 micrograms/dL [129 nmol/L]) and a TSH concentration greater than 15 mU/L during the first year of life have lower IQ values than patients whose T_4 concentrations were held constant at higher concentrations. Thereafter, thyroid function test values should be kept at age-appropriate concentrations, which in children differ from those for adults. On TH-replacement therapy, TSH levels should be maintained between 0.5 and 2.0 mU/L during the first 3 years of life. Clinical evaluation of the infant by the practitioner should be conducted at frequent intervals during the first 3 years of age (see "Follow-up" below). Because poor compliance and noncompliance have major sequelae, initial and ongoing counseling of parents is of great importance.

Current international organizations such as the American Clinical Laboratory Association recommend that the FT_4, rather than the total T_4, be measured to assess the concentration of the biologically relevant, unbound or free form of circulating T_4. The cost of total T_4 plus TBG or T_3 resin uptake, versus the FT_4 by most methods (excluding the more costly direct dialyzable or ultrafiltration methods), should be comparable. However, although the total T_4 is a robust measure, it should be recognized that most direct FT_4 assays are influenced, to some extent, by protein binding. Consequently, the FT_4 values obtained vary between assays.

During TH therapy, 4 or more episodes of insufficiently suppressed TSH (>5 mU/L) after the age of 6 months were the most important variables associated with school delay. Usually, these episodes are caused by poor parental compliance or impaired T_4 bioavailability. The latter may be caused by inhibition of T_4 intestinal uptake by specific foods (soy, fiber) and medications (iron, calcium), malabsorption, or increased degradation (anticonvulsants; large hemangiomas with high deiodinase activity). The Food and Drug Administration has deemed several generic L-T_4 products to be equivalent to some currently branded preparations. Any change in source of the L-T_4, especially if not a standard brand, requires retitration of the dose.

Follow-Up

Clinical examination, including assessment of growth and development, should be performed every few months during the first 3 years of life. Infants with CH appear to be at increased risk of other congenital anomalies (approximately 10% of infants with CH, compared with 3% in the general population). Cardiovascular anomalies, including pulmonary stenosis, atrial septal defect, and ventricular septal defect, are the most common.

Infants need to undergo frequent laboratory and clinical evaluations of thyroid function, growth, and development to ensure optimal T_4 dosage and adherence to their therapy regimen. Serum T_4 and TSH measurements should be performed:

1. At 2 and 4 weeks after the initiation of L-T_4 treatment
2. Every 1 to 2 months during the first 6 months of life
3. Every 3 to 4 months between 6 months and 3 years
4. Every 6 to 12 months until growth is completed
5. At more frequent intervals when compliance is questioned, abnormal values are obtained, or dose or source of medication has been changed; FT_4 and TSH measurements should be repeated 4 weeks after any change in L-T_4 dosage

The aim of therapy is to ensure normal growth and development by maintaining the serum total T_4 or FT_4 concentration in the upper half of the reference range in the first year of life, with a serum TSH in the reference range (optimally 0.5–2.0 mU/L).

Some infants will have serum TSH concentrations in the range of 10 to 20 mU/L despite T_4 concentrations in the upper half of the reference range. Rarely, the elevated TSH relative to the FT_4 value is hypothesized to result from in utero hypothyroidism, producing a resetting of the pituitary-thyroid feedback threshold. A failure of the serum FT_4 concentration to increase into the upper half of the reference range by 2 weeks and/or failure of the TSH concentration to decrease to less than 20 mU/L within 4 weeks after initiation of L-T_4 administration should alert the physician that the child may not be receiving adequate L-T_4 regularly. At this point, careful inquiry should be made regarding compliance, dose of medication, and method of administration. When attempting to achieve the optimal concentration of circulating FT_4, physicians should always bear in mind the adverse effects of excessive medication and thus be prepared to monitor blood concentrations of FT_4 at close intervals. Prolonged hyperthyroidism has been associated with premature craniosynostosis.

CLINICAL ALGORITHM(S)

An algorithm is provided in the original guideline document for "Newborn Screening for Congenital Hypothyroidism."

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence supporting each recommendation is not specifically stated.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Improved screening and therapy for congenital hypothyroidism (CH) and, consequently, improved developmental outcomes (i.e., eradication of mental retardation)

POTENTIAL HARMS

- Screening. Both primary thyroid-stimulating hormone (TSH)/backup thyroxine (T_4) method and primary T_4/backup TSH method can render false-negative or false-positive results
- Thyroid Scanning. The usual dose of ^{123}I, the preferred isotope, is 0.925 MBq (25 microCi). This represents a small amount of radiation exposure, equivalent to the amount of exposure with 2 to 3 chest radiographs. However, the radiation exposure is potentially 100 times greater if ^{131}I or large doses of isotope are administered.
- Treatment. Care should be taken to avoid administration of soy, fiber, or iron concomitantly with administration of levothyroxine, as they can interfere with thyroid hormone absorption.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.
- There is controversy regarding the need for thyroid hormone (TH) therapy in the setting of normal thyroxine (T_4) and elevated thyroid-stimulating hormone (TSH) values. There have been no long-term studies to evaluate cognitive development in this group of patients.
- There remains some controversy regarding the risk-benefit ratio of early thyroid scanning of infants with suspected hypothyroidism.
- Physicians cannot and must not relinquish their clinical judgment and experience in the face of normal newborn thyroid test results. Failure of normal development can result from hypothyroidism in infants who had normal T_4 and TSH newborn screening results. Hypothyroidism can manifest or be acquired after the newborn screening. Rarely, the newborn screening test results can be in error, or human error can result in failure to notify the infant's physician of abnormal test results. When clinical symptoms and signs suggest hypothyroidism, regardless of newborn screening results, serum FT_4 and TSH determinations should be performed.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American Academy of Pediatrics, Rose SR, Section on Endocrinology and Committee on Genetics, American Thyroid Association, Brown RS, Public Health Committee, Lawson Wilkins Pediatric Endocrine Society, Foley T, Kaplowitz PB, Kaye CI, Sundararajan S, Varma SK. Update of newborn screening and therapy for congenital hypothyroidism. Pediatrics 2006 Jun;117(6):2290-303. [87 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2006 Jun

GUIDELINE DEVELOPER(S)

American Academy of Pediatrics - Medical Specialty Society
American Thyroid Association - Professional Association

SOURCE(S) OF FUNDING

American Academy of Pediatrics

GUIDELINE COMMITTEE

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AAP Committee on Genetics
American Thyroid Association, Public Health Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

All clinical reports and policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American Academy of Pediatrics (AAP) Policy Web site.

Print copies: Available from American Academy of Pediatrics, 141 Northwest Point Blvd., P.O. Box 927, Elk Grove Village, IL 60009-0927.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on July 12, 2006. The information was verified by the guideline developer on August 18, 2006.

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